

**What is claimed is:**

1. An encoding method for digital watermarking in a calibrated printing path comprising:
  - a) receiving a pixel possessing color values from an input image;
  - b) receiving a plurality of information bits to be encoded at a corresponding pixel in an output image;
  - c) selecting one of at least two different GCR functions where the selection is based on the state of said received information bits;
  - d) generating CMYK values using said selected GCR function and said color values; and
  - e) assigning said CMYK values to said corresponding pixel in said output image.
2. An encoding method, as in **claim 1**, wherein the pixel color values from the input image are in an RGB colorspace and then converted to CMY values.
3. An encoding method, as in **claim 1**, wherein the number of GCR functions to be selected from is dependent on the number of possible states of the information bits intended to be encoded at each image pixel.
4. An encoding method, as in **claim 3**, wherein the number of GCR functions to be selected from equals the number of states of the information bits intended to be encoded at each image pixel.
5. An encoding method, as in **claim 1**, wherein said output image, when printed, exhibits the property that substantially similar colors occurring at different spatial locations in the input image are produced with substantially different CMYK combinations in the print.

6. An encoding method, as in **claim 1**, wherein the GCR spatially varies across the output image.
7. An encoding method as in **claim 1**, wherein the information bits to be encoded at a given pixel indicate the type of object to which that pixel belongs, such as: graphics, picture, text, line art, etc..
8. An encoding method, as in **claim 1**, wherein at least two GCR functions are optimized to carry information.
9. An encoding method, as in **claim 1**, wherein information bits intended to be encoded within said output image are represented with a tag.
10. An encoding method, as in **claim 1**, wherein information bits intended to be encoded within said output image are represented with an auxiliary image plane.
11. An encoding method, as in **claim 10**, wherein the auxiliary image plane selects the GCR functions used for encoding.
12. An encoding method, as in **claim 1**, wherein a parameterized function is used for the GCR function and the encoded state sets the parameter of the function.
13. An encoding method, as in **claim 1**, further comprising compensating for regions that cannot be encoded by GCR information.
14. An encoding method, as in **claim 1**, further comprising redundantly encoding the information bits throughout the output image.

15. An encoding method, as in **claim 1**, further comprising applying a reference mark on the output image to indicate the starting point and order of the information sequence.
16. An encoding method for digital watermarking in a calibrated printing path comprising:
  - a) receiving a pixel possessing color values from an input image;
  - b) receiving a plurality of information bits to be encoded at a corresponding pixel in an output image;
  - c) selecting one of at least two different functions that map input color values to output colorant values, where the selection is based on the state of said received information bits;
  - d) generating output colorant values using said selected function and said input color values; and
  - e) assigning said output colorant values to said corresponding pixel in said output image.
17. A system for encoding a digital watermark in a calibrated printing path comprising:

a processor in communication with a storage device;  
software and hardware resources sufficient to perform:

  - a) receiving a pixel possessing color values from an input image;
  - b) receiving a plurality of information bits to be encoded at a corresponding pixel in an output image;
  - c) selecting one of at least two different GCR functions where the selection is based on the state of said received information bits;
  - d) generating CMYK values using said selected GCR function and said color values; and
  - e) assigning said CMYK values to said corresponding pixel in said output image; and

a device for generating said output image.

18. A system for encoding a digital watermark, as in **claim 17**, wherein the pixel color values from the input image are in an RGB colorspace and then converted to CMY values.
19. A system for encoding a digital watermark, as in **claim 17**, wherein the number of GCR functions to be selected from is dependent on the number of possible states of the information bits intended to be encoded at each image pixel.
20. A system for encoding a digital watermark, as in **claim 20**, wherein the number of GCR functions to be selected from equals the number of states of the information bits intended to be encoded at each image pixel.
21. A system for encoding a digital watermark, as in **claim 17**, wherein said output image, when printed, exhibits the property that substantially similar colors occurring at different spatial locations in the input image are produced with substantially different CMYK combinations in the print.
22. A system for encoding a digital watermark, as in **claim 17**, wherein the GCR spatially varies across the output image.
23. A system for encoding a digital watermark, as in **claim 17**, wherein the information bits to be encoded at a given pixel indicate the type of object to which that pixel belongs, such as: graphics, picture, text, line art, etc..
24. A system for encoding a digital watermark, as in **claim 17**, wherein at least two GCR functions are optimized to carry information.
25. A system for encoding a digital watermark, as in **claim 17**, wherein information bits intended to be encoded within said output image are represented with a tag.

26. A system for encoding a digital watermark, as in **claim 17**, wherein information bits intended to be encoded within said output image are represented with an auxiliary image plane.
27. A system for encoding a digital watermark, as in **claim 26**, wherein the auxiliary image plane selects the GCR functions used for encoding.
28. A system for encoding a digital watermark, as in **claim 17**, wherein a parameterized function is used for the GCR function and the encoded state sets the parameter of the function.
29. A system for encoding a digital watermark, as in **claim 17**, further comprising compensating for regions that cannot be encoded by GCR information.
30. A system for encoding a digital watermark, as in **claim 17**, further comprising redundantly encoding the information bits throughout the output image.
31. A system for encoding a digital watermark, as in **claim 17**, further comprising applying a reference mark on the output image to indicate the starting point and order of the information sequence.

32. A system for encoding a digital watermark in a calibrated printing path comprising:

- a processor in communication with a storage device;
- software and hardware resources sufficient to perform:
  - a) receiving a pixel possessing color values from an input image;
  - b) receiving a plurality of information bits to be encoded at a corresponding pixel in an output image;
  - c) selecting one of at least two different functions that map input color values to output colorant values, where the selection is based on the state of said received information bits;
  - d) generating output colorant values using said selected function and said input color values; and
  - e) assigning said output colorant values to said corresponding pixel in said output image; and
- a device for generating said output image.